Semi-Tandem Electric Distributed Wing Zip Aviation Advanced Concept

Completed Technology Project (2013 - 2015)

Project Introduction

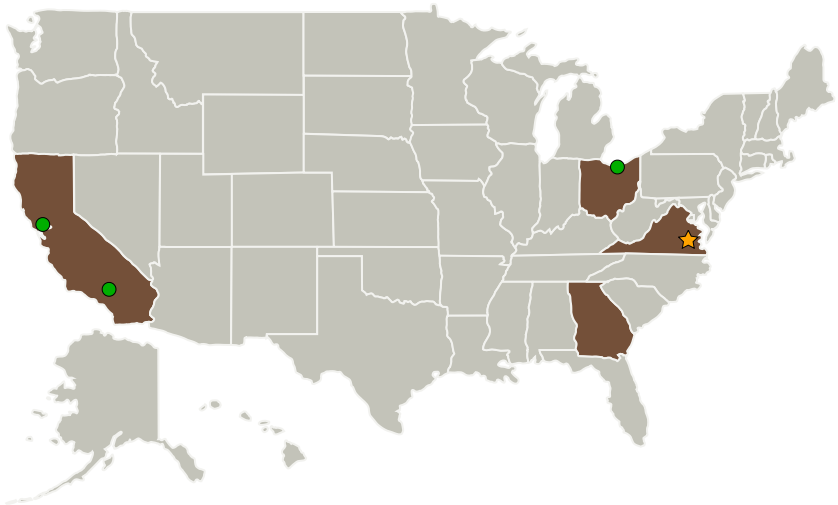
This project aims to develop a unique distributed electric propulsion approach that provides breakthrough capability improvements across conventional take-off and landing, short takeoff and landing, and vertical takeoff and landing aircraft through tight coupling of the propulsion, aerodynamics, control, structure, and acoustics.

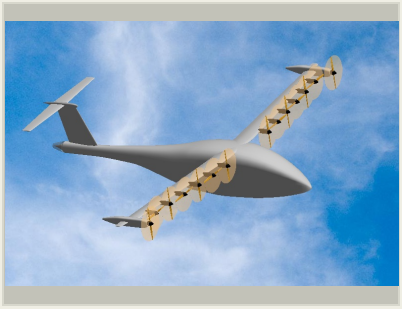
Electric Propulsion (EP) is a rapidly developing technology frontier that opens up the degrees of freedom for aircraft design/integration. Inherently EP wants to distribute across the airframe due to it's scale-free nature, this lets the thrust be located for optimal drag. Electric motors are highly compact and reliable. The efficiency and power to weight of electric motors/controllers are relatively insensitive to scale (not true for internal combusion or Turbine engines). Distributed EP permits high degrees of coupling between the aerodynamics, propulsion, control, acoustics, and even the structure to enable large multi-disciplinary synergistic benefits.

Anticipated Benefits

Distributed EP permits high degrees of coupling between the aerodynamics, propulsion, control, acoustics, and even the structure to enable large multi-disciplinary synergistic benefits.

Primary U.S. Work Locations and Key Partners





Project Image Semi-Tandem Electric Distributed Wing Zip Aviation Advanced Concept

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
●Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California
●Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Co-Funding Partners	Type	Location
Georgia Institute of Technology-Main Campus(GA Tech)	Academia	Atlanta, Georgia
Joby Aviation	Industry	
Toyota	Industry	

Primary U.S. Work Locations	
California	Georgia
Ohio	Virginia

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Center Independent Research & Development: LaRC IRAD

Project Management

Program Manager:

Julie A Williams-byrd

Project Manager:

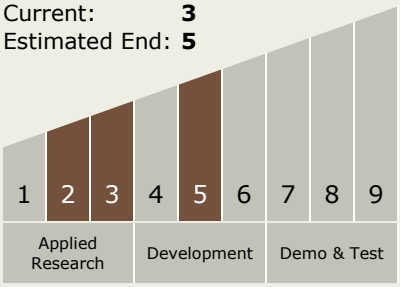
Mark D Moore

Principal Investigator:

Mark D Moore

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **5**



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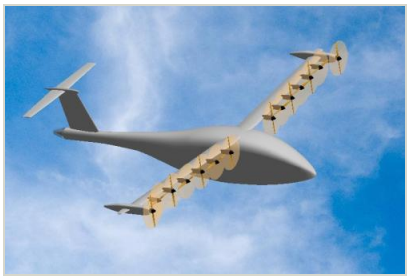
Images



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Project Image Semi-Tandem Electric Distributed Wing Zip Aviation Advanced Concept
(https://techport.nasa.gov/image/2299)

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.3 Aero Propulsion
    - TX01.3.8 All Electric Propulsion